

- 10 -

CLAIMS

1. A disposable ophthalmic lens used in contact with an eye comprising:

5 a holder supporting one or more lenses, at least a portion of the holder being formed of a material that is photoreactive so as to change color in the presence of light;

a contact lens formed of a transparent material other than glass mounted in the holder, the lens having a first surface shaped to contact an eye when in use;

10 a non-light transmissive package enclosing the holder and contact lens to prevent the holder portion from changing color while enclosed in the package.

2. A disposable ophthalmic lens as recited in claim 1 wherein said contact lens is formed of polymethylmethacrylate.

3. A disposable ophthalmic lens as recited in claim 1 wherein the holder is formed of a plastic with a photochromic dye in the portion thereof that changes color.

4. A disposable ophthalmic lens as recited in claim 1 wherein the holder is formed of acrylic with a photochromic dye in the portion thereof that changes color.

5. A disposable ophthalmic lens as recited in claim 1 wherein the holder is formed of styrene with a photochromic dye in the portion thereof that changes color.

- 11 -

6. A disposable ophthalmic lens as recited in claim 1 wherein the holder is formed of polycarbonate with a photochromic dye in the portion thereof that changes color.

7. A disposable ophthalmic lens as recited in claim 1 wherein the color change of the holder portion is irreversible.

8. A disposable ophthalmic lens as recited in claim 1 wherein said contact lens is formed of a plastic.

9. A disposable ophthalmic lens as recited in claim 1 wherein the contact surface of the contact lens has an approximate shape of a cornea and a surface of the contact lens opposite the contact surface is aspheric.

10. A disposable ophthalmic lens as recited in claim 1 wherein the contact lens is mounted in a first end of the holder, a second lens is mounted in an end of the holder opposite the first lens and a third lens is disposed between the first and second lens.

11. A disposable ophthalmic lens as recited in claim 10 wherein the second and third lenses are formed of a material other than glass.

12. A disposable ophthalmic lens as recited in claim 11 wherein the contact lens, second lens and third lens are formed of polymethylmethacrylate.

13. A disposable ophthalmic lens as recited in claim 10 wherein a real image is formed in the second lens.

- 12 -

14. A disposable ophthalmic lens as recited in claim 10 wherein the contact lens has an aspheric surface opposite the contact surface and the second lens has a first and second surface both of which are aspheric.

15. A disposable ophthalmic lens as recited in claim 10 wherein each of the second and third lenses contributes to the optical power of the ophthalmic lens.

16. A disposable ophthalmic lens as recited in claim 10 wherein the ophthalmic lens has a field of view that is greater than or equal to 60°.

17. A disposable ophthalmic lens used in contact with an eye comprising:

a contact lens formed of a transparent plastic, the lens having a surface shaped to contact an eye when in use;

5 a holder for supporting one or more lenses when in use including the contact lens, the holder having an aperture therein for receiving the one or more lenses and at least a portion of the holder being formed of a material that changes appearance in response to a change in the holder's environment.

18. A disposable ophthalmic lens as recited in claim 17 wherein the change in appearance is irreversible.

19. A disposable ophthalmic lens as recited in claim 18 wherein the contact lens is formed of polymethylmethacrylate.

- 13 -

20. A disposable ophthalmic lens as recited in claim 18 wherein the contact lens is an injection molded lens.
21. A disposable ophthalmic lens as recited in claim 18 wherein the contact lens is a compression molded lens.
22. A disposable ophthalmic lens as recited in claim 18 wherein the contact lens is a cast lens.
23. A disposable ophthalmic lens as recited in claim 18 wherein the contact lens is a machined lens.
24. A disposable ophthalmic lens as recited in claim 17 wherein the material of the holder is photoreactive so as to change colors when exposed to light.
25. A disposable ophthalmic lens as recited in claim 24 including a non-light transmissive package enclosing the holder and contact lens.
26. A disposable ophthalmic lens as recited in claim 24 wherein the color change on exposure to light is irreversible.
27. A disposable ophthalmic lens as recited in claim 17 including at least one other lens supported in the holder, all of the lens being formed of a transparent plastic.
28. A disposable ophthalmic lens as recited in claim 17 including an image lens mounted in an end of the holder opposite an end

- 14 -

of the holder in which the contact lens is mounted and a field lens disposed between the contact lens and image lens.

29. A disposable ophthalmic lens as recited in claim 28 wherein said ophthalmic lens has at least three aspheric surfaces.

30. A disposable ophthalmic lens as recited in claim 29 wherein one of the aspheric surfaces is a surface of the contact lens and the two other aspheric surfaces are surfaces of the image lens.

31. A disposable ophthalmic lens as recited in claim 17 wherein the contact lens has a surface opposite the eye contacting surface that is aspheric.

32. A disposable ophthalmic lens used in contact with an eye comprising:

5 a plurality of lenses formed of a transparent material other than glass, including a contact lens having a surface shaped to contact an eye when in use and having an opposite surface that is aspheric;

a holder for supporting the plurality of lenses, at least a portion of the holder being formed of a material that changes color to indicate the ophthalmic lens has been used.

33. A disposable ophthalmic lens as recited in claim 32 wherein the color change is irreversible.

34. A disposable ophthalmic lens as recited in claim 32 wherein the lenses are formed of a transparent plastic.

- 15 -

35. A disposable ophthalmic lens as recited in claim 34 wherein the lenses are formed of polymethylmethacrylate.

36. A disposable ophthalmic lens as recited in claim 34 wherein the lenses are compression molded lenses.

37. A disposable ophthalmic lens as recited in claim 34 wherein the lenses are cast lenses.

38. A disposable ophthalmic lens as recited in claim 34 wherein the lenses are machined.

39. A disposable ophthalmic lens as recited in claim 32 wherein the material that changes color is photoreactive so as to change colors when exposed to light.

40. A disposable ophthalmic lens as recited in claim 39 including a non-light transmissive package enclosing the holder and contact lens prior to use.

41. A disposable ophthalmic lens as recited in claim 32 including an image lens mounted in an end of the holder opposite an end of the holder in which the contact lens is mounted and a field lens disposed between the contact lens and image lens.

42. A disposable ophthalmic lens as recited in claim 41 wherein said ophthalmic lens has at least three aspheric surfaces.

- 16 -

43. A disposable ophthalmic lens as recited in claim 42 wherein one of the aspheric surfaces is a surface of the contact lens and the two other aspheric surfaces are surfaces of the image lens.

44. A disposable ophthalmic lens as recited in claim 32 wherein the contact lens has a field of view greater than or equal to 60°.

45. A disposable ophthalmic lens used in contact with an eye comprising:

5 a plastic holder supporting one or more lenses;
a sterile contact lens formed of a transparent plastic mounted in the holder, the contact lens having a first surface shaped to contact an eye when in use and a second surface that is aspheric; and
a package enclosing the holder supporting one or more lenses including the contact lens to maintain the contact lens free from contamination.

46. A disposable ophthalmic lens as recited in claim 45 wherein said contact lens is formed of polymethylmethacrylate.

47. A disposable ophthalmic lens as recited in claim 45 wherein the holder is acrylic.

48. A disposable ophthalmic lens as recited in claim 45 wherein the holder is styrene.

49. A disposable ophthalmic lens as recited in claim 45 wherein the holder is polycarbonate.

- 17 -

50. A disposable ophthalmic lens as recited in claim 45 wherein at least a portion of the holder is photoreactive so as to change color when exposed to light and the package is non-light transmissive.

51. A disposable ophthalmic lens as recited in claim 45 wherein the contact lens is mounted in a first end of the holder, a second lens is mounted in an end of the holder opposite the first lens and a third lens is disposed between the first and second lens.

52. A disposable ophthalmic lens as recited in claim 51 wherein the second and third lenses are formed of a transparent plastic.

53. A disposable ophthalmic lens as recited in claim 52 wherein the contact lens, second lens and third lens are formed of polymethylmethacrylate.

54. A disposable ophthalmic lens as recited in claim 51 wherein a real image is formed in the second lens.

55. A disposable ophthalmic lens as recited in claim 51 wherein the contact lens has an aspheric surface opposite the contact surface and the second lens has a first and second surface both of which are aspheric.

56. A disposable ophthalmic lens as recited in claim 51 wherein each of the second and third lenses contributes to the optical power of the ophthalmic lens.

57. A disposable ophthalmic lens as recited in claim 51 wherein the ophthalmic lens has a field of view that is greater than or equal to 60°.

58. An ophthalmic lens used in contact with an eye comprising:

a holder supporting a plurality of lenses;

a contact lens mounted in a first end of the holder, the contact

5 lens having a first surface shaped to contact an eye when in use and a second surface that is aspheric;

10 an intermediate lens mounted in the holder and spaced between the contact lens and an image lens, the intermediate lens bending peripheral rays from the contact lens towards the image lens and contributing optical power; and

an image lens mounted in a second end of the holder with a positive first surface through which rays from the intermediate lens enter and are focused to form a real image inside the lens and a second surface that magnifies the real image.

59. An ophthalmic lens as recited in claim 58 wherein the aspheric surface of the contact lens neutralizes the optical power of the cornea.

60. An ophthalmic lens as recited in claim 58 wherein the field of view of the ophthalmic lens is greater than or equal to 60°.

61. An ophthalmic lens as recited in claim 58 wherein the contact lens, intermediate lens and image lens each have a thickness less than 14 mm.

- 19 -

62. An ophthalmic lens as recited in claim 58 wherein the contact lens, intermediate lens and image lens each have a thickness less than or approximately equal to 13 mm.

63. An ophthalmic lens as recited in claim 58 wherein the first and second surfaces of the image lens are aspheric surfaces.

64. An ophthalmic lens used in contact with an eye comprising:

a holder supporting a plurality of lenses;

5 a contact lens mounted in a first end of the holder, the contact lens having a first surface shaped to contact an eye when in use and a second surface that is aspheric;

10 an image lens mounted in a second end of the holder with a positive first surface through which rays enter and are focused to form a real image inside the lens and a second surface that magnifies the real image; and

an intermediate lens mounted in the holder and spaced between the contact lens and the image lens, the intermediate lens contributing optical power and wherein the ophthalmic lens has a field of view greater than or equal to 60°.

65. An ophthalmic lens as recited in claim 64 wherein the aspheric surface is defined by the equation

$$Z = \frac{Cr^2}{1 + \sqrt{1 - (1+k)C^2r^2}} + A_1r^2 + A_2r^4 + A_3r^6.$$

- 20 -

66. An ophthalmic lens as recited in claim 64 wherein the aspheric surface of the contact lens neutralizes the optical power of the cornea.

67. An ophthalmic lens as recited in claim 64 wherein the aspheric surface is defined by the equation

$$Z = \frac{Cr^2}{1 + \sqrt{1 - (1 + k)C^2 r^2}} + A_1 r^2 + A_2 r^4 + A_3 r^6.$$

68. An ophthalmic lens as recited in claim 64 wherein the contact lens, intermediate lens and image lens each have a thickness less than 14 mm.

69. An ophthalmic lens as recited in claim 64 wherein the contact lens, intermediate lens and image lens each have a thickness less than or approximately equal to 13 mm.

70. An ophthalmic lens as recited in claim 64 wherein each of the lenses is formed of a plastic material and the holder is formed of a plastic material.

71. An ophthalmic lens used in contact with an eye comprising:

a holder supporting a plurality of lenses;

a contact lens mounted in a first end of the holder, the contact

5 lens having a first surface shaped to contact an eye when in use and a second surface that is aspheric;

an image lens mounted in a second end of the holder with a positive first surface through which rays enter and are focused to form a

10 real image inside the lens and a second surface that magnifies the real image, the first and second surfaces of the image lens being aspheric; and

15 an intermediate lens mounted in the holder and spaced between the contact lens and image lens to contribute optical power to the ophthalmic lens and wherein the aspheric surfaces of the contact lens and image lens are defined by

$$Z = \frac{Cr^2}{1 + \sqrt{1 - (1+k)C^2r^2}} + A_1r^2 + A_2r^4 + A_3r^6.$$